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E-VIDYA: A Safe Alternative to Mobile Phones for School Learning

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Abstract: E-VIDYA is a proposed compact learning device designed to give school students access to study material without requiring a personal smartphone. Students sometimes use mobile phones for schoolwork but may also become distracted by games, videos and unrelated applications. E-VIDYA aims to provide a focused learning environment for students from Class 3 to Class 10. The device stores selected textbook-based content and question-answer material locally. A student can ask a question through a microphone. The voice is converted into text using an offline speech-recognition system. The software then searches the stored educational content and displays a suitable answer on a screen. The same answer is also read aloud through a speaker. The proposed design uses a compact single-board computer, microphone, speaker, display and simple controls inside a clock-style enclosure. To reduce cost and improve reliability, the first version will use a prepared question-answer database instead of a large language model. The system is intended to work without an active internet connection after the required software and content have been installed. This paper describes the proposed design, working method, cost-saving choices and expected limitations. Practical testing will be required to measure speech-recognition accuracy, answer relevance and response time.

Keywords: E-VIDYA, Educational Device, Offline Learning, Speech Recognition, Text-to-Speech, School Students, Mobile Phone Distraction, Raspberry Pi.

I. INTRODUCTION

Mobile phones are useful for education, but they also provide access to games, entertainment and social media. When students use a phone only to search for study answers, they may get distracted by other applications. This project proposes E-VIDYA, a separate learning device that focuses on school subjects and does not provide general mobile applications. The target users are students from Class 3 to Class 10. The device will contain selected study content based on the textbooks and topics chosen by the project team. Instead of typing a question, a student can ask it by speaking. The device processes the voice, searches its stored content and gives the answer through both the display and speaker. The main aim is not to replace teachers or textbooks. It is to provide a simple additional learning aid that can be used at home or in a classroom.

II. OBJECTIVES

- To develop a dedicated educational device that avoids the distractions of a general-purpose mobile phone.
- To provide stored learning material for students from Class 3 to Class 10.
- To accept spoken questions through a microphone and convert them into text.
- To search locally stored educational content and show a relevant answer on the screen.
- To read the answer aloud through a speaker for easier access.
- To keep the basic learning functions available without an internet connection.

III. PROPOSED METHODOLOGY

The proposed system follows a simple sequence of operations:

Voice Input: The student presses a button and asks a question. A microphone captures the voice.

Speech-to-Text: An offline speech-recognition engine converts the captured voice into written text. A suitable language model must be installed before offline use.

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Question Processing: The software cleans the recognized text and identifies important words or phrases in the question.

Content Search: The system searches a locally stored database containing subject-wise questions, answers and textbook notes.

Answer Display: The selected answer is shown on the screen in a readable format.

Voice Output: A text-to-speech tool reads the same answer through the speaker.

Offline Operation: The device uses its locally stored software and study material. Internet access is not required for normal question answering after setup.

IV. SYSTEM DESIGN AND WORKING

The main hardware and software units proposed for E-VIDYA are:

• Processing unit: A Raspberry Pi board or another compatible low-cost single-board computer.

• Input unit: A microphone and a push-to-talk button.

• Output unit: A display and a small speaker.

• Storage: A microSD card containing the operating system, speech model and educational database.

• Software: Offline speech recognition, a question-search program, a local database and text-to-speech.

Working flow: Student speaks a question → Microphone captures voice → Offline speech-to-text → Question is matched with stored content → Answer appears on screen → Speaker reads the answer.

To keep the first version practical, the project will use a controlled educational database. It will not try to answer every possible question like a large online AI chatbot. If a suitable answer is not found, the device should display a message such as “Please try another question” rather than showing an unrelated answer.

V. COST-REDUCTION PLAN

The total cost can be reduced by simplifying the first prototype. The most important change is to avoid running a large language model on the device. A prepared database of textbook-based questions and answers requires less processing power and storage. The following changes are proposed:

Part	Suggested change	Reason
Processing board	Use a Raspberry Pi 4 (2 GB) already available to the team, a suitable used board, or another board verified to run the selected speech model.	Avoid buying a high-end Raspberry Pi 5 unless testing proves it is necessary.
Display	Keep the planned 7-inch display, but choose a basic HDMI display without touch if touch input is not essential.	Use a push button for voice input and simple physical controls.
Speech recognition	Use a small offline speech model such as Vosk, after testing the required language on the selected board.	Avoid resource-heavy speech models for the first prototype.
Answer generation	Use a subject-wise local database and keyword/question matching.	Do not run a large offline LLM in the low-cost version.
Audio	Use one low-cost microphone and a small speaker module.	Avoid multiple microphones and high-power audio hardware.
Power	For the college demonstration, use a stable 5V power adapter if portability is not required.	Add a battery only if the final use case requires it.
Enclosure	Use a simple locally made clock-style case or a reused project enclosure.	Avoid a custom 3D-printed case in the first prototype.

Recommended low-cost prototype: retain the 7-inch screen if it is a project requirement, use a basic non-touch display, a push-to-talk button, a small speaker, a single microphone, a locally stored question-answer database and a suitable low-cost processing board. Actual prices depend on the supplier, board availability and display type; the team should

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prepare a bill of materials using current local quotations before final submission.

VI. EXPECTED ADVANTAGES

• Provides a study-focused device without general mobile applications.

• Allows students to ask questions by voice instead of typing.

• Displays and speaks the selected answer.

• Can provide basic learning support without continuous internet access.

• Stores selected study material locally for repeated use.

• Can be expanded with more subjects and classes after testing.

VII. LIMITATIONS AND CHALLENGES

• Speech recognition may not correctly understand every accent or noisy classroom voice.

• Support for Marathi, Hindi and English must be checked separately; the selected offline model may not support every language equally.

• The database can answer only questions covered by the stored content and matching rules.

• A 7-inch display and processing board may still form a major part of the total cost.

• Textbook content must be checked for correctness, class level and permitted use.

• The device will need updates when new lessons or corrected answers are added.

VIII. TESTING AND EVALUATION PLAN

After building the prototype, the team will test it with a selected set of questions from different subjects and classes. The tests should record whether the spoken question is converted correctly, whether the correct stored answer is selected, how long the response takes and whether the answer is clearly visible and audible. Testing should be carried out in a quiet room and in a moderately noisy environment. Results should be reported only after actual experiments; no accuracy or performance value is claimed in this proposal.

IX. CONCLUSION

E-VIDYA is a proposed safe alternative to using a general-purpose mobile phone for school-related questions. It is planned as a dedicated device for students from Class 3 to Class 10, with voice input, offline content search, screen display and spoken answers. The project can become more affordable by using a prepared educational database, lightweight offline speech recognition, a non-touch display, simple controls and a basic enclosure. The first version will focus on reliable answers from selected study material rather than trying to behave like a full online chatbot. Future work may include adding more subjects, improving multilingual voice support and testing the device with students under teacher supervision.

REFERENCES

[1] Alpha Cephei, “Vosk Offline Speech Recognition Toolkit,” official project website. Available: https://alphacephei.com/vosk/ (accessed 30 October 2026).

[2] Alpha Cephei, “Vosk API: Offline Speech Recognition for Android, iOS, Raspberry Pi and Servers,” GitHub repository. Available: https://github.com/alphacep/vosk-api (accessed 30 October 2026).

[3] Raspberry Pi Ltd., “Raspberry Pi 4 Specs and Benchmarks,” Raspberry Pi official magazine. Available: https://magazine.raspberrypi.com/articles/raspberry-pi-4-specs-benchmarks (accessed 30 October 2026).

[4] SunFounder, “Speech-to-Text with Vosk (Offline),” AI Lab Kit Documentation. Available: https://docs.sunfounder.com/projects/ai-lab-kit/en/latest/llm/python_stt_vosk.html (accessed 30 October 2026).

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